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CYCLES OF EMPLOYMENT AND UNEMPLOYMENT IN THE UNITED STATES, 1914–1921

By W. A. Berridge, *Harvard University*

The relation between unemployment and the business cycle may be regarded in either of its two aspects. Students of unemployment are chiefly interested in the role of the business cycle in unemployment, that is, the part played by depressions in causing unemployment and distress. Students of the business cycle are, or should be, interested in the opposite aspect, the role of unemployment in the business cycle. Yet the literature on the business cycle indicates a remarkable neglect of unemployment, except for a secondary interest on the part of some writers in cyclical unemployment as a social problem. Writers on both subjects have been inclined to assume, explicitly or tacitly, that the American data on unemployment were not worthy of intensive analysis either as a measure of the social problem or as an index of business conditions. Moreover, this subject seems to be neglected increasingly by the authorities on the business cycle. Some of the earlier writers, such as Burton,[1] Tougan-Baranowsky,[2] Laurent and Georges Cahen,[3] showed more than ordinary interest in unemployment; but when we come to Mitchell and Persons,[4] whose great works are today among the most authoritative on the business cycle, we find unemployment practically ignored. Those who have been willing to concede any place to unemployment as a register of the business cycle have generally based their views either on deductive reasoning or on an examintion of the unemployment percentages for Great Britain. No writer on unemployment or on the business cycle has ever undertaken a rigorous quantitative analysis of the American data on employment and unemployment.[5]

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[1] Theodore E. Burton, *Financial Crises and Periods of Industrial and Commercial Depression.* New York: D. Appleton & Co. 1902.

[2] Michel Tougan-Baranowsky, *Les Crises Industrielles en Angleterre.* Paris: Giard et Brière. 1913.

[3] Georges Cahen and Edmond Laurent, *Rapports Présentés au nom de la Commission sur les Indices des Crises Economiques*, etc. Paris: French Labor Office. 1911.

[4] Professor Mitchell mentions the unemployment *problem* on several occasions, but gives little attention to any *data* except the British. (Wesley C. Mitchell, *Business Cycles.* Berkeley, California: University of California Press. 1913.)

Professor Persons refers to unemployment in only one connection. He gives as one reason for an index of business conditions its possible usefulness to "government officials when handling the problem of unemployment." (Warren M. Persons, "Construction of a Business Barometer Based upon Annual Data," *Amer. Economic Rev.*, vol. 6, p. 739, Dec., 1916.) In his much greater work on monthly indexes, Professor Persons does not even mention unemployment. (*Indices of Business Conditions.* Cambridge, Massachusetts: Harvard University Press. 1919.)

[5] See Hornell Hart, *Employment Fluctuations in the United States, 1902–1917*, Cincinnati, Helen S.

The purpose of this and the succeeding articles is therefore to show wherein these American data are useful in the study of unemployment and in the study of the business cycle. In the present article, which is devoted to the war and post-war periods, the first task is to survey the field of current data on the subject, and from the data to construct if possible a continuous *index* of general industrial employment from the outbreak of the war to date.[1]

During the period under review, several state and national bureaus have collected quantitative information as to employment conditions. The leading state organizations which have attempted to do this are located in New York state, Massachusetts, Wisconsin, and New Jersey.[2] *A priori* there are certain considerations which show the relative merits of these states as representative samples of the industrial situation. Table I shows the relative importance of the four states in the total number of industrial wage-earners, according to the Censuses of Manufactures. New York ranks far above the other three, and indeed ranks above all the other states in the Union, having almost one sixth of the country's manufacturing industry, or about twice the quota of Massachusetts, three times that of New Jersey, and five times that of Wisconsin.

TABLE I

GEOGRAPHICAL DISTRIBUTION OF WAGE-EARNERS EMPLOYED IN MANUFACTURING INDUSTRIES[a] IN SELECTED STATES

(Unit: one per cent)

	1914	1909	1904
United States	100.0	100.0	100.0
New York	15.0	15.2	15.7
Massachusetts	8.6	8.8	8.9
New Jersey	5.3	4.9	4.9
Wisconsin	2.8	2.8	2.8

[a] Source: *Abstract of Census of Manufactures*, 1914, p. 272. The decennial Censuses of Occupations disclose a similar relationship.

Further economic considerations also suggest the key position of

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Trounstine Foundation, 1918, and William M. Leiserson, *Unemployment in the State of New York*. New York. 1911. Mr. Leiserson of course confines himself to New York data; and his statistical analysis of even these is not rigorous. Mr. Hart's study is comprehensive and highly laborious, but is unfortunately foredoomed to failure by the nature of the method employed. He seeks to measure the total volume of unemployment by subtracting the total "volume of employment" from the total "normal labor supply" in the United States. In both of these large quantities there are considerable errors of estimation, which of course assume a much greater relative magnitude when applied to the difference between the two quantities.

[1] Presenting in expanded form one section of an article in the *Rev. of Economic Stat.*, prel. vol. 4, pp. 17–56, Jan., 1922.

[2] Two states are purposely omitted: Illinois, owing to the very recent inauguration of the series (May, 1921); and Pennsylvania, because data were reported only for a short time early in the war.

New York state compared with New Jersey and Massachusetts—its greater industrial diversification[1]; its peculiarly favorable location in relation to coal, iron, and other raw materials, and, normally, to the supply of immigration; its access to the import and export trade by way of the Port, and to interior markets by the canals and the Great Lakes, as well as by rail; finally, the central geographical position of New York with reference to the other great industrial states.

Remembering these differences in the industrial importance of the several states, we may review briefly the leading employment data available. In Chart 1 are shown three semi-adjusted indexes, those of the United States Bureau of Labor Statistics and the Industrial Commissions of New York and Wisconsin; also two wholly unadjusted series, one representing the original items reported until December, 1918, to the New Jersey Bureau of Labor Statistics, the other representing the items reported to the United States Employment Service since January, 1921.

The first curve in Chart 1 represents the semi-adjusted indexes based upon the month-to-month link relatives reported by the United States Bureau of Labor Statistics. These have been compounded into chain relatives, which in turn have been combined for the several industries, using weights proportional to the importance of the industries according to the 1914 Census of Manufactures.[2] These weighted chain relatives have then been reduced to the average for the census year 1919 as a base, yielding a series with several points of merit. The geographical distribution of the data is fairly broad, covering the largest manufacturing states, of which the fifteen in Table II are the most important. They are arranged according to the number of wage-earners employed in the boom of 1920 and the depression of 1921.

In industrial make-up the series is somewhat peculiar. In the distribution of the 600,000 to 800,000 wage-earners actually embodied in the returns, the automobile, iron, and steel industries are represented strongly, textiles and others lightly; but the process of weighting by the Census of Manufactures turns the tables, greatly reducing the emphasis on metal industries and stressing the textiles instead. A glance at Table III (a) will show that the groups have been so selected that those falling under "textiles" have a weight of about 45 per cent, and those falling under metals, about 35 per cent. This gives a much

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[1] Pennsylvania is the only state which excels New York in the scope and diversity of manufacturing industries. See XIII Census, *Supplement for New York*, 1909, p. 689. In Massachusetts, on the other hand, two or three industries are dominant—cotton especially.

[2] These unpublished figures have been kindly supplied by Mr. Ethelbert Stewart, U. S. Commissioner of Labor Statistics. It is the intention of the writer to change the weighting to conform to the 1919 Census returns, upon their appearance.

CHART I-RECENT DATA ON EMPLOYMENT IN THE UNITED STATES

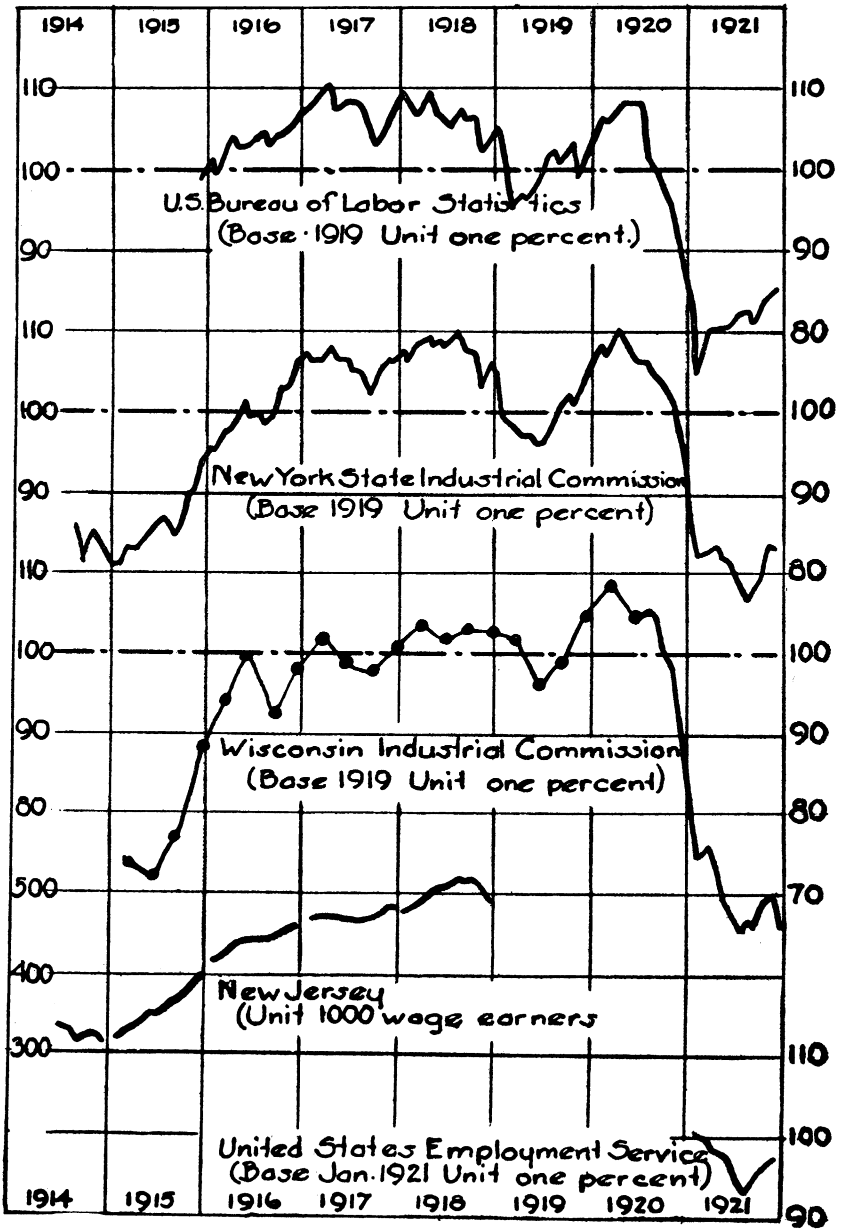

TABLE II

GEOGRAPHICAL DISTRIBUTION OF UNITED STATES BUREAU OF LABOR STATISTICS DATA ON EMPLOYMENT[a]

(Unit: one per cent)

	March 1920	July 1921
1. Pennsylvania	19.7	16.4
2. Massachusetts	12.8	14.9
3. Michigan	13.0	13.3
4. New York	12.6	12.2
5. Ohio	9.0	7.1
6. Illinois	6.8	6.9
7. New Hampshire	2.5	3.8
8. New Jersey	2.7	3.1
9. Missouri	2.2	2.7
10. Indiana	2.8	2.4
11. Maine	1.7	2.1
12. Rhode Island	1.5	1.8
13. Alabama	1.7	1.8
14. Connecticut	1.4	1.5
15. Colorado	1.3	1.1
Other states	8.3	8.9
Grand total	100.0	100.0

[a] Data supplied by Mr. Ethelbert Stewart, Commissioner of Labor Statistics.

stronger representation to the textile industry than is justified by the Census of Manufactures, in which the textile industry amounts only to 21 per cent of all manufacturing.

The second curve in Chart 1 represents, in semi-adjusted form, the employment index of the New York State Industrial Commission. This index includes on the average about a half-million wage-earners. Although restricted geographically, it is superior in industrial composition to the index just described. It is especially significant that machinery, iron, and steel form an influential component of this index, since it has been shown that employment fluctuations in the metals and machinery industries in New York state register very accurately fluctuations in other lines of industrial activity.[1] Overweighting the metal group, therefore, is more advantageous than otherwise; whereas the overweighting of textiles, especially cotton, introduces in pronounced form the effect of crop cycles which in a considerable measure are independent of business cycles.

The first two curves in Chart 1 show a remarkably close agreement in both timing and amplitude. Each of the slight discrepancies noted is wholly attributable to differences in the industrial distribution: textiles are represented strongly in the Bureau of Labor index, but only weakly in the New York index, in which metals, machinery, etc., outweigh textiles and their products.

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[1] The relationship is even more conclusively demonstrated by the employment data than by the production data analyzed by Professor E. E. Day. *Rev. of Economic Stat.*, compare preliminary vol. 3, pp. 366–7, Dec., 1920, and vol. 4, pp. 29, 30, 37, Jan., 1922.

TABLE III

LEADING POST-WAR EMPLOYMENT DATA: INDUSTRIAL COMPOSITION

(Unit: one per cent)

(a) UNITED STATES BUREAU OF LABOR STATISTICS[1]

(*Standard weights based on United States Census of Manufactures, 1914*)

Industry	
1. Iron and steel (blast furnaces, steel works and rolling mills)	12.0
2. Car building and repairing (steam cars, by railroads and other companies)	17.0
3. Automobiles (including bodies and parts)	5.5
4. Cotton goods	16.4
5. Dyeing and finishing textiles (exclusive of that done in textile mills)	2.1
6. Hosiery and knit goods	6.5
7. Woolen and worsted goods	6.9
8. Men's clothing	7.5
9. Silk goods (including throwsters)	4.7
10. Leather (tanned, curried and finished)	2.4
11. Boots and shoes (including cut stock	8.6
12. Paper (including wood pulp)	3.8
13. Tobacco (including cigars and cigarettes)	6.6
Total	100.0

(b) NEW YORK STATE INDUSTRIAL COMMISSION[2]

Industry	March 1920	June 1921
1. Metals, machinery and conveyances	38.4	30.1
2. Textiles	10.8	12.4
3. Clothing, millinery, laundering, etc.	13.2	14.6
4. Furs, leather, and rubber goods	7.7	8.3
5. Food, beverages and tobacco	8.0	10.6
6. Printing and paper goods	7.3	8.4
7. Paper	1.6	1.2
8. Chemicals, oils, paints, etc.	5.3	6.0
9. Wood manufactures	4.6	4.8
10. Stone, clay and glass products	2.3	2.6
11. Water, light and power	0.8	1.0
Total	100.0	100.0

(c) MASSACHUSETTS BUREAU OF STATISTICS[3]

Industry	Aver. 1914	Aver. 1918
1. Cotton and small wares	21.5	16.1
2. Boots and shoes	12.7	10.8
3. Woolens and worsteds	9.0	8.5
4. Foundry and machine-shop products	6.8	12.3
5. Electrical machinery	2.8	3.0
6. Paper and wood pulp	2.2	2.1
7. Leather	1.7	1.5
Total	56.7	54.3
Grand total	100.0	100.0

(d) UNITED STATES EMPLOYMENT SERVICE (JUNE, 1921)[4]

Industry	
1. Iron and steel and their products	21.3
2. Textiles and their products	16.7
3. Vehicles for land transportation	11.3
4. Food and kindred products	8.0
5. Metal and metal products other than steel	4.7
6. Chemicals and allied products	4.6
7. Railroad repair shops	3.5
8. Paper and printing	3.3
9. Leather and finished products	3.2
10. Tobacco and its manufacture	1.9
11. Lumber and its manufacture	1.4
12. Stone, clay and glass products	.9
13. Liquors and beverages	.1
14. Miscellaneous industries	18.1
Total	100.0

The employment curve for Wisconsin fluctuated in nearly the same manner as the others shown in Chart 1, except that the amplitude of its movement in the recent depression is somewhat greater. In form, the Wisconsin index more closely resembles the index for New York than that for the United States, because in Wisconsin as in New York the metal industries are very heavily represented. The Wisconsin curve in Chart 1 really represents not one series but two,[1] which though not wholly alike in nature have been grafted together by the Industrial Commission of Wisconsin. The figures reported monthly since July, 1920, are based on establishments representing one fourth to one third of the wage-earners engaged in manufacturing industries in Wisconsin.[2] The quarterly figures extending from the first quarter of 1915 to the second quarter of 1920 covered a much smaller proportion, probably 15 to 20 per cent. Differences in the inclusiveness, the industrial composition, and the purpose[3] of the two series of reports may account for the peculiarity in the form of the curve. It is especially probable that a standardization of the industrial weights in the two periods will make the composite series more trustworthy as a continuous record for the years since 1915.[4]

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[1] Source: Unpublished information furnished by Mr. Ethelbert Stewart, U. S. Commissioner of Labor Statistics.

[2] Source: *Labor Market Bulletin*, March, 1920, p. 4, and June, 1921, p. 4.

[3] Source: *Annual Report on Statistics of Manufactures*, 1914, pp. vii, xii–xv.

[4] Source: *Industrial Employment Survey Bulletin*, August, 1921, pp. 2, 3.

The two curves of original items at the foot of Chart 1 merit only passing attention. Employment in New Jersey increased during the war in much the same manner as in other states, so far as may be judged by the chart. The New Jersey data were not continuous between calendar years, and, furthermore, they were discontinued altogether in 1918,[5] so that the available fragments are not useful in setting up a current index of employment.

The index established in January, 1921, by the United States Employment Service has not yet covered a period long enough to prove or disprove its merit empirically. In general it has followed a course not unlike the New York and Wisconsin indexes during 1921, even though no recovery occurred in February, 1921, in the Employment Service index, as appeared in the other indexes. Theoretically, at least, the series seems promising. It covers about one and a half million wage-earners, a larger number than any other index now being reported currently. Its industrial composition, though imperfect, is on the whole well planned, being fairly representative of manufacturing in the United

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[1] As to the industrial distribution of the earlier series of reports no published information is available. The following are the chief groups represented in the newer and more comprehensive series: machinery (19.3), automobiles (7.8), pulp and paper (7.2), railroad repair shops (5.3). The metal-working industries, including automobiles, railroad repair shops, and machinery, have amounted to 45 per cent of the total. Source: Industrial Commission of Wisconsin, *Bulletin 3*, pp. 3–4, Nov., 1920.

[2] For further facts on the nature of this series see Industrial Commission of Wisconsin, *Biennial Report*, 1918–20, esp. p. 81; also the Commission's monthly *Bulletins*.

[3] The purpose of the earlier reports was simply to obtain data on the incidence of industrial accidents, in order to check up the rates provisionally assumed in the workmen's compensation act. Until July, 1920, reports were made to the Commission only by self-insured employers, but after July, 1921, many employers insuring with the compensation companies began to report.

[4] The writer's surmise on this point is confirmed by the independent study of the problem by Mr. A. J. Altmeyer, Statistician to the Commission, whose intention is now to standardize the weights.

[5] According to a recent communication from Mr. J. A. T. Gribbin, who also kindly placed at the writer's disposal the unpublished data for 1917 and 1918.

States.[1] This series also has the advantage that current data are published earlier than those for other series, being telegraphically reported by the district directors of the Service and announced shortly afterward by the central office at Washington. It must, however, be admitted that corresponding to this advantage is the correlative disadvantage that some of the basic reports seem to be gathered by the directors from the employers by such methods and in such haste as to cast doubt on some of the results.

In Chart 2 are shown some fully corrected indexes of employment and unemployment available during and since the war. The second curve represents the employment cycles in Massachusetts, fully adjusted by a special method to form a continuous series.[2] The third curve represents the employment cycles obtained by analysis and inversion of the quarterly *unemployment* data for Massachusetts. The first curve represents the index that is probably the most reliable current measure of the general employment cycle in the United States. It is the average of the employment indexes of the United States Bureau of Labor Statistics and the New York Industrial Commission, corrected for seasonal variation, etc., like the other curves on Chart 2.

Why should the proposed current index be made up of these two components and no others? The choice hinges on the purpose in view. The purpose of the writer has been to construct an index with the following properties: (a) its components must have been reported in a comparable form for a sufficiently long period to establish a basis for empirical test, comparison, and appraisal; (b) it must be reasonably representative, industrially and geographically; and (c) its components must be reported currently, in monthly form, with reasonable promptness, and with accuracy. Among all these series only the above-mentioned combination meets the three tests. The Massachusetts employment series lacks the third property, since the monthly figures

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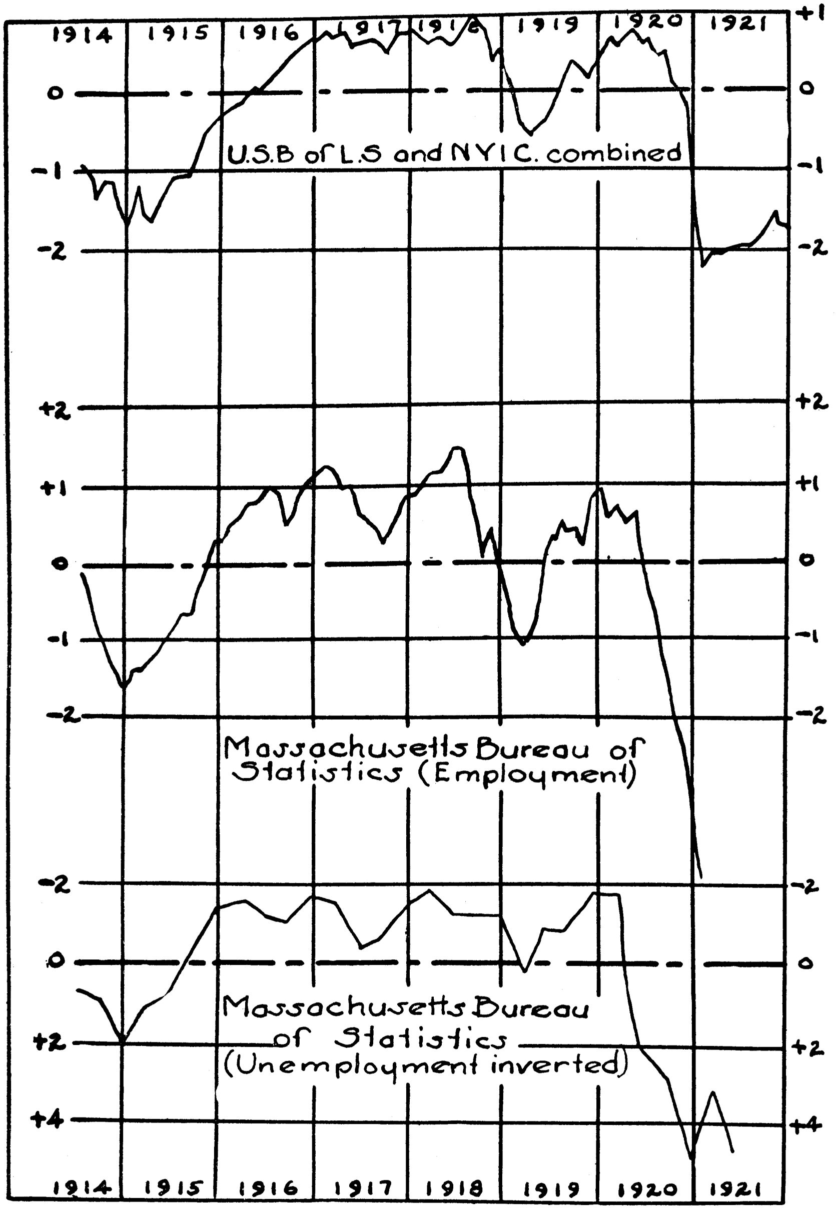
[1] The chief objections to its industrial composition are that (1) the iron and steel group is somewhat overweighted (21.3 v. 15.8 per cent of the aggregate); (2) textiles are underweighted (16.7 v. 21.3 per cent); vehicles are greatly overweighted (11.3 v. 3.7 per cent) and lumber greatly underweighted (1.4 v. 11.9 per cent).

[2] There are two reasons for applying a special method here: (1) The Massachusetts data are not continuous between successive calendar years, and for intercensal years are several degrees less complete than those collected in Massachusetts during the census years by the United States Census Bureau, and therefore were "stepped up" by 3 per cent to form, in conjunction with the census data, a homogeneous series; (2) the cotton industry is relatively much less important (approximately 6 per cent) in the country's manufacturing than in the manufacturing of Massachusetts (16 to 20 per cent). In view of the resulting exaggeration of the special crop cycles to which the cotton industry is subject, in addition to the ordinary business cycles, the cotton industry was analyzed separately from the others and combined with them on the basis of its importance in the entire country.

Throughout the present investigation the methods employed for elimination of seasonal variation, secular trend, etc., are substantially those devised by Professor Warren M. Persons (*Rev. of Economic Stat.*, prel. vol. 1, pp. 3–205, Jan. and Apr. 1919). Variations were introduced only where necessitated by the peculiar nature of some of the employment data.

CHART 2- CORRECTED INDICES OF EMPLOYMENT
(Unit one standard deviation)



for each year are not known until long after the end of the year.[1] The unemployment data for Massachusetts are quarterly, not monthly. The New Jersey series is defunct. The Employment Service data are so new that they fail to meet test (a). Indeed, both the index of the New York Industrial Commission and that of the United States Bureau of Labor Statistics fail when taken singly to meet the first half of test (b), since the former index has been shown to over-stress metals, and the latter, textiles. The latter meets admirably the second half of test (b) concerning geographical representation, and according to the industrial position of New York and to findings concerning employment in the pre-war period, to be discussed in a later article, the New York index should also be highly representative of the industrial states. Each of these two indexes meets test (a) better than do any others now being reported. The failure of the two single indexes to fulfil condition (b) as to industrial character is largely remedied by the mere process of combination: the textile and the iron industries are thereby restored more nearly to their true relationship. Admittedly, the groups including iron and steel and their products enjoy a weight somewhat (though only moderately) in excess of their true importance. This fact, in so far as it is true, constitutes a real advantage, because, as stated elsewhere, employment in the metal industries has for a long time fluctuated in striking harmony with employment in other industries combined.[2] In the light of all these facts, there is a very strong probability that the average of these two series shows the consensus of monthly employment fluctuations in the United States in recent years better than any other series or combination of series.

According to the corrected index based on these two series, employment has passed through some interesting phases during the past eight years. These fluctuations may be attributed in part to the business cycle and in part to other factors, notably the shutting off of immigration and the military demand for men. The depression of 1914–15, the war boom of 1916–18, the relapse during the half year after the armistice, the boom of 1919–20, the acute depression of 1920–21, and the incipient recovery in recent months are in a measure reflections of the change in the demand for production, and therefore in one sense simply a passive factor in the business cycle. But during the war employment became a potent limiting factor.

In April, 1917, our entry into the war introduced a tremendous new factor into the labor market. The military call for man power affected employment enormously for a period of twenty months. During that time the labor supply became one of the factors most drastically limiting economic activity. Enlistments, which increased immediately after our entry into the war, were supplemented by the first increment of the draft in the late summer of 1917, and in 1918 by several additional increments amounting to about two and a half million more men. The rapidly increasing drain of man power from civil life is shown by Chart 3, representing the total army personnel by months.[1] The number increased from 200,000 to more than 1,000,000 before the end of 1917, and to 3,600,000 at the time of the armistice, finally attaining a rate of increase of 400,000 men a month. These figures of course fail to tell the absolute magnitude of the loss of industrial wage-earners from civil life, because many other economic classes were likewise being drawn. They do, however, show fairly well the increasingly rapid rate of change in the supply of available man power, and consequently account for some of the dents in the employment curve. Undoubtedly, these dents would have been much deeper but for the heavy influx of women, youths, and young girls from home and school into industry, as well as that of adult male labor transferred from normal occupations in office or farm work to certain lines of manufacturing, under the double attraction of high wages and a deferred classification in the draft.

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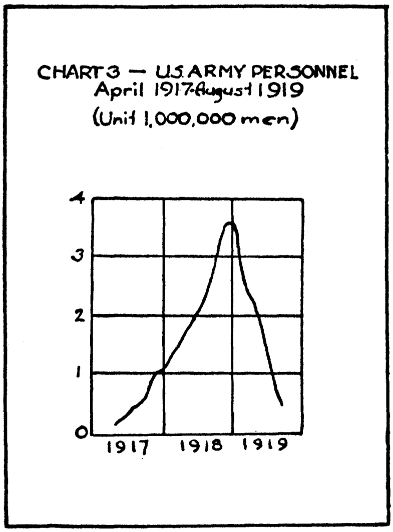
[1] The only figures collected *currently* by the Massachusetts Bureau are those supplied to the United States Employment Service. These relate only to a very limited number of establishments, and are not strictly comparable with the earlier data.

[2] *Rev. of Economic Stat.*, prel. vol. 4, pp. 29, 30, 37, Jan., 1922.



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[1] Source: Colonel Leonard P. Ayres, Chief of Statistical Branch, General Staff, *The War with Germany, a Statistical Summary*, p. 15.

Demobilization shows an illuminating but quite different relation to the employment index. During the first six months after the armistice, discharges took place at twice the average monthly rate of mobilization, reducing the strength of the army from 3,600,000 to 2,000,000 by April, and to 1,000,000 before July, 1919. The discharge of enlisted men alone averaged 400,000 a month during the first half of 1919.[1] It is evident from a comparison of Charts 2 and 3 that most of this huge labor supply was being dumped on a falling market. At the time when employers were rapidly dismissing their employees in the post-armistice slump, soldiers were being discharged from the army. At the bottom of the slump in midsummer of 1919,[2] 2,000,000 soldiers had been discharged, several hundred thousand of whom must have remained unemployed for months before being reabsorbed in industry.[3] If the relapse of 1919 had not been fairly brief, there would have arisen still more urgently the question as to whether the demobilization policy adopted did not allow a rate of discharge so high that it hampered proper industrial reabsorption, and precipitated a needless unemployment crisis.[4] In either event, the labor supply previously withdrawn from the market by military demands was restored so soon after the war that when the recovery came in 1919–20 industry could proceed unchecked by such potent limitations as had prevailed in the two preceding years, and without need of resorting so widely to inexpert labor from other fields.

The monthly employment index affords a remarkably accurate picture of the production cycle. No comprehensive monthly data on production were available until recent years, especially post-war years. For the years 1919–21 Chart 4 shows the adjusted employment index, compared with a semi-adjusted index of the volume of manufacture. The latter is based upon Professor Day's "unadjusted index of the volume of manufacture," but since Professor Day has not yet eliminated seasonal variation from his unadjusted index, the writer has first eliminated that component of seasonal variation chargeable to the varying length of calendar months, dividing each monthly item of the unadjusted index by the number of days in that month, and multiplying by 30.4, the average number of days in a month; the next step was to divide the items resulting from the preceding step by their own standard deviation. The correspondence between the adjusted employment index and the semi-adjusted production index is astonishingly close, the correlation coefficient being 96.9 per cent. The writer has shown elsewhere that the *uncorrected* percentage deviations of employment and production from their respective trends fail to agree in amplitude. Production appears to respond with more elasticity; *i. e.*, it has a greater amplitude than employment, both above and below the normal trend.[1] But when these inequalities of amplitude are eliminated, as in Chart 4, the resulting cycles nearly coincide.[2] In view of the close relation between the two indexes since the war, it is probable that the corrected employment index itself affords a reliable picture of production cycles in earlier years, when comprehensive production data were not available.

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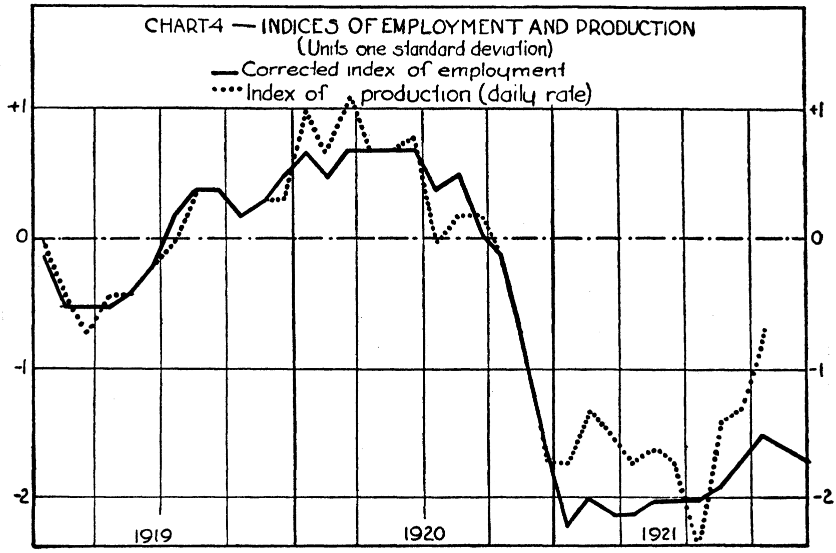
[1] Secretary of War, *Annual Report*, 1919, p. 17.

[2] This statement refers, of course, to the general index of employment. Employment had begun to improve earlier in the summer in some industries, notably textiles. See *Rev. of Economic Stat.*, prel. vol. 4, p. 25, chart 3, Jan., 1922.

[3] The situation disclosed by the two curves probably accounts in part for the prevalent impression that the soldiers returning in 1919 "did not want to work." Apparently lack of the opportunity to work was also a potent factor.

[4] It may be observed that approximately the last million men were returned to civil life in more moderate instalments, much better timed with reference to the business cycle.



It now seems abundantly clear that the interrelations of the employment data collected from independent sources during and since the war are of such a high order as to establish a fairly strong presumption in favor of their validity. The several indexes show such a clear agreement among themselves that the construction of a compound index has seemed justifiable. A convincing testimonial to the efficacy of the monthly employment index is found in its relationship to production throughout 1919–21, the only period for which a comprehensive monthly index of production can yet be constructed. Further supporting evidence of several kinds, which will be presented later, will demonstrate the validity of the employment data even more conclusively.

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[1] *Rev. of Economic Stat.*, prel. vol. 4, p. 18, Jan., 1922. For the reasons cited, see *ibid.*, pp. 18, 19.

[2] The parallelism is maintained in December and January. The drop in production during July of all years is due to hot weather, stock-taking, vacations, and a holiday.

In interpreting these results one should constantly bear in mind that the object of the present study has been merely to construct a continuous *index*, and not to estimate the actual *volume*, of unemployment—unemployment prevailing either at a given time or on the average over an extended period. As Bowley[1] well says of the British unemployment percentages, all these figures "can only be used to *measure* unemployment after a troublesome and hazardous estimate; their use is rather to form an *index* of unemployment which shall reach its maxima and minima at the worst and best times respectively, and fluctuate much or little as the state of the labor market is unstable or steady."

The index method for attacking the unemployment problem is not the one commonly used by writers on the subject, but to the present writer it seems to be the only one likely to yield results of high reliability. It is unquestionably the best for tracing the relation of unemployment to the business cycle, and it is not improbable that it offers the best possibilities also for the ultimate estimation of the *volume* of unemployment, though this latter point will require demonstration. In either event, it seems impossible to make even a reasonably accurate estimate of the volume of unemployment by working from the *absolute magnitudes* of the unemployment percentages.[2] The writer, in proposing to the President's Conference on Unemployment the use of the adjusted indexes as a rough check on estimates of unemployment[3]—such as the special "unemployment surveys"—regarded this use as a mere by-product of the index method, the results of which must be interpreted cautiously. Others who have subsequently used the results have sometimes overrated their accuracy. Though pointing out the presence of a large probable error in the unemployment estimate based on the index, the writer believes that the errors introduced by using the actual percentages of unemployed are probably far greater. The entire problem of estimating the volume of unemployment cannot be solved satisfactorily in the present state of knowledge. It is probably unsafe to judge whether the problem is even determinate or not until the isolation of seasonal, cyclical, and other factors in the problem has been completely presented. When this has been done, a thorough critique of the recent unemployment estimates will be presented.

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[1] Arthur L. Bowley, *Elementary Manual of Statistics*, 3d ed., 1920, p. 155.

[2] This other method of attack is typified by Mr. E. S. Bradford's work on the subject. See "Methods of Measuring Unemployment," *Quart. Pub. of the Amer. Stat. Ass'n.*, Vol. XVII, pp. 983–94, Dec., 1921.

[3] Harvard Economic Service, *Special Letter on Industrial Employment*, Oct. 8, 1921, p. 6; also *Report of the President's Conference on Unemployment*, 1921, pp. 52–56.